

Application No. 09/599,963
October 31, 2005
Reply to office action of August 10, 2005

Amendments to the Claims

Please amend the claims as follows:

1. (Previously amended): A method of determining a total processing overhead delay between a first node and a second node in a network connected to both the first node and the second node, the method comprising:

- a) determining interim transit delays processing overhead delays between adjacent nodes in a communications path between the start node and the end node including the following steps:
 - a1) sending a first signal from a common node to the first node;
 - a2) receiving a first response signal at the common node from the first node in response to the first signal;
 - a3) determining a first round trip time, the first round trip time being a time elapsed between steps a) and b);
 - a4) sending a second signal from the common node to the second node;
 - a5) receiving a second response signal at the common node from the second node in response to the second signal;
 - a6) determining a second round trip time, the second round trip time being a time elapsed between steps d) and e); and
 - a7) calculating the transit delay between the first node and the second node according to the formula

$$D(X,Y)= | R(NMC,X)-R(NMC,Y) | /2$$

where

$D(X,Y)$ is the transit delay between first node X and second node Y;
 $R(NMC,X)$ is the first round trip time;
 $R(NMC,Y)$ is the second round trip time; and
NMC is the common node;

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- a8) subtracting a previously determined minimum transit delay between the first node and the second node with the transit delay between the first node and the second node; and
- b) calculating the total transit overhead processing delay between the start node and the end node by adding up the interim transit processing overhead delays.
2. (Original): A method as in claim 1 wherein at least one of the first and second nodes are directly connected to the common node.
3. (Original): A method as in claim 1 wherein at least one of the first and second nodes are indirectly connected to the common node.
4. (Original): A method as in claim 1 wherein the common node is a network management computer.
5. (Original): A method as in claim 1 wherein the hierarchical network is a portion of a mesh network.
6. (Cancelled):
7. (Cancelled):
8. (Cancelled):
9. (Cancelled):
10. (Cancelled):

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11. (Cancelled):

12. (Cancelled):

13. (Previously amended): A method of determining the quality of communications between two nodes in a network, the method comprising:

- a) measuring a transit delay between the two nodes at different times resulting in a plurality of transit delay measurements;
- b) calculating a jitter among the plurality of time delay measurements based on measuring a variance of the plurality of transit delay measurements; and
- c) determining if the jitter exceeds a predetermined threshold value.

14. (Original): A method as in claim 13 wherein the network is a hierarchical network and the transit delay is measured between a first node and a second node using the following method:

- a) sending a first signal from a common node to the first node;
- b) receiving a first response signal at the common node from the first node in response to the first signal;
- c) determining a first round trip time, the first round trip time being a time elapsed between steps a) and b);
- d) sending a second signal from the common node to the second node in response to the second signal;
- e) receiving a second response signal at the common node from the second node in response to the second signal;
- f) determining a second round trip time, the second round trip time being a time elapsed between steps d) and e); and
- g) calculating the transit delay between the first node and the second node according to the formula

$$D(X,Y)=|R(NMC,X)-R(NMC,Y)|/2$$

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where

$D(X,Y)$ is the transit delay between first node X and second node Y ;

$R(NMC,X)$ is the first round trip time;

$R(NMC,Y)$ is the second round trip time; and

NMC is the common node.

15. (Original): A method as in claim 13 wherein the transit delay is measured between a start node and an end node in a hierarchical network using the following method:

a) determining interim transit delays between adjacent nodes in a communications path between the start node and the end node; and

b) calculating the total transit delay between the start node and the end node by adding up the interim transit delays.

16. (Original): A method as in claim 14 wherein the hierarchical network is a portion of a mesh network.

17. (Original): A method as in claim 15 wherein the hierarchical network is a portion of a mesh network.

18. (Original): A method as in claim 13 wherein step c) includes determining if at least one of the transit delay measurements exceeds a predetermined threshold value.

19. (Previously amended): A method of determining a jitter between two transit delay measurements between two nodes, the method comprising:

calculating the jitter based on

$$J(A,D,t) = D(A,D,t2) - D(A,D,t1))$$

where

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$J(A,D,t)$ is the jitter between the two transit delay measurements based on measuring a variance of the two transit delay measurements;

$D(A,D,t_1)$ is one of the two transit delay measurements taken at time t_1 ;

$D(A,D,t_2)$ is the other of the two transit delay measurements taken at time t_2 ; and

A and D are the two nodes between which the transit delay is measured.

20. (Original): A method as in claim 19 wherein the two nodes are directly connected to each other.

21. (Original): A method as in claim 19 wherein the two nodes are indirectly connected to each other.

22. (Cancelled): ~~A method of determining a total jitter between a start node and an end node in a network, the method comprising:~~

~~a) determining interim jitters in transit delays between adjacent nodes based on a communications path between the start node and the end node;~~

~~b) calculating the total jitter based on transit delays previously calculated between the start node and the end node by adding up the interim jitters.~~

23. (Original): A method of determining a jitter between a plurality of transit delay measurements between two nodes, the method comprising :

calculating the jitter based on

$$J(A, B) = \frac{\sqrt{\sum_{i=1}^M D(A, B, i)^2}}{\sum_{i=1}^M D(A, B, i)}$$

where

$J(A,B)$ is the jitter between the plurality of transit delay measurements;

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$D(A,B,i)$ is the i^{th} transit delay measurement among the plurality of transit delay measurements; and

M is the number of transit delay measurements.

24. (Original): A method as in claim 23 wherein the two nodes are directly connected to each other.

25. (Original): A method as in claim 23 wherein the two nodes are indirectly connected to each other.

26. (Original): A method of determining a signal processing time in a node, the method comprising:

a) determining at least one round trip delay time of a transmission between a node A and a node K;

b) determining a round trip delay time of a transmission between a node B and a node K;

c) determining a lowest recorded value for the round trip delay time between node A and node K;

d) calculating the signal processing time through node A according to:

$$P(A) = R(K,B) - \text{minimum}(R(K,A))$$

where

$P(A)$ is the signal processing time through node A;

$R(K,B)$ is a round trip delay time between node B and node K; and

$(\text{minimum}(R(K,A)))$ is the lowest recorded value for the round trip delay time between node A and node K.